

CLAIMS

What is claimed is:

- 5 1. A pressure washer, comprising
a frame;
an engine mounted to said frame;
a pump coupled to said engine, said pump further comprising:
a piston assembly including a piston;
10 an eccentric assembly suitable for converting rotary motion of a rotating shaft to
rectilinear motion; and
a strap for coupling said eccentric assembly and said piston assembly;
wherein said strap is suitable for communicating the rectilinear motion of said
eccentric assembly to said piston assembly for reciprocating said piston in
15 said cylinder to pump said liquid.
2. The pressure washer as claimed in claim 1, wherein said eccentric
assembly comprises:
a shaft suitable for being coupled to a drive shaft of an engine;
20 at least one bearing assembly for supporting said shaft in said pump housing so
that said shaft may rotate; and
an eccentric for converting the rotary motion of said shaft to rectilinear motion.
3. The pressure washer as claimed in claim 2, wherein said eccentric
25 assembly further comprises a counterweight assembly coupled to said shaft for
counterbalancing movement of said piston assembly.
4. The pressure washer as claimed in claim 1, wherein said strap is flexible.
- 30 5. The pressure washer as claimed in claim 1, wherein each piston assembly
further comprises a strap coupling member and clamping block for coupling said piston
assembly to said strap.

6. The pressure washer as claimed in claim 1, wherein said piston is formed of one of ceramic and nitrated steel.

5 7. The pressure washer as claimed in claim 1, further comprising a head assembly for porting said liquid through said pump.

8. The pressure washer as claimed in claim 1, further comprising a pulse hose for absorbing pressure pulsation in the liquid induced by pumping.

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9. The pressure washer as claimed in claim 8, further comprising a pulse hose retainer for retaining said pulse hose.

10. The pressure washer as claimed in claim 9, wherein the pulse hose retainer
15 comprises a body having a first aperture and a second aperture, the first aperture being suitable for receiving said pulse hose, and the second aperture being suitable for securing said pulse hose retainer to said frame.

11. A pressure washer, comprising
a frame;
an engine mounted to said frame;
5 a pump coupled to said engine for pumping a liquid;
a pulse hose for absorbing pressure pulsation in the liquid induced by pumping; and
a pulse hose retainer for retaining said pulse hose,
wherein the pulse hose retainer comprises a body having a first aperture and a second
aperture, the first aperture being suitable for receiving said pulse hose, and the
10 second aperture being suitable for securing said pulse hose retainer to said frame.

12 The pressure washer as claimed in claim 11, wherein said pump further
comprises:
a piston assembly including a piston;
15 an eccentric assembly suitable for converting rotary motion of a rotating shaft to
rectilinear motion; and
a strap for coupling said eccentric assembly and said piston assembly;
wherein said strap is suitable for communicating the rectilinear motion of said
eccentric assembly to said piston assembly for reciprocating said piston in
20 said cylinder to pump said liquid.

13. The pressure washer as claimed in claim 11, wherein said eccentric
assembly comprises:
a shaft suitable for being coupled to a drive shaft of an engine;
25 at least one bearing assembly for supporting said shaft in said pump housing so
that said shaft may rotate; and
an eccentric for converting the rotary motion of said shaft to rectilinear motion.

14. The pressure washer as claimed in claim 13, wherein said eccentric assembly further comprises a counterweight assembly coupled to said shaft for counterbalancing movement of said piston assembly.

5 15. The pressure washer as claimed in claim 11, wherein said strap is flexible.

16. The pressure washer as claimed in claim 11, wherein each piston assembly further comprises a strap coupling member and clamping block for coupling said piston assembly to said strap.

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17. The pressure washer as claimed in claim 11, wherein said piston is formed of one of ceramic and nitrated steel.

15 18. The pressure washer as claimed in claim 11, further comprising a head assembly for porting said liquid through said pump.

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19. A pressure washer, comprising
a frame assembly,
an engine mounted to said frame assembly; and
a pump mounted to said frame assembly and coupled to said engine, said pump further
5 comprising:

a pump assembly having at least one piston assembly, said piston assembly driven
by said engine for pumping the liquid from a first pressure to a second
pressure;

a head assembly coupled to said pump assembly, said head assembly including an
10 inlet portion suitable for receiving the liquid at the first pressure and an
outlet portion suitable for outputting the liquid at the second pressure; and

a valve assembly disposed in said head assembly, said valve being suitable for
opening to circulate the liquid within said head assembly from said inlet
portion to said outlet portion as said pump is started and closing to
15 circulate the liquid through said piston assembly once a predetermined
rate of flow of the liquid through the pump is achieved.

20. The pressure washer as claimed in claim 19, wherein said head assembly
includes a formed valve body having a port from said inlet portion to said outlet portion.
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21. The pressure washer as claimed in claim 20, wherein said valve assembly
includes a ball, a ball seat, and a spring, wherein said ball is held away from said ball seat
by said spring as said pump is started opening said port and allowing circulation of the
liquid between said inlet portion and said outlet portion, and wherein the liquid forces
25 said ball against said ball seat overcoming said spring to at least partially block said port
once the predetermined flow of the liquid is achieved.

22. The pressure washer as claimed in claim 21, further comprising a plug for
closing said valve body.
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23. The pressure washer as claimed in claim 19, further comprising:

an eccentric assembly suitable for converting rotary motion of a rotating shaft of the engine to rectilinear motion; and
a flexible strap for coupling said eccentric assembly and said piston assembly;
wherein said strap is suitable for communicating the rectilinear motion of said eccentric
5 assembly to said piston assembly for reciprocating said piston to pump said liquid.

24. The pressure washer as claimed in claim 23, wherein said eccentric assembly comprises:

10 a shaft suitable for being coupled to the drive shaft of an engine;
at least one bearing assembly for supporting said shaft in said pump assembly so that said shaft may rotate; and
an eccentric for converting the rotary motion of said shaft to rectilinear motion.

15 25. The pressure washer as claimed in claim 24, wherein said at least one bearing assembly comprises a sealed bearing.

26. The pressure washer as claimed in claim 15, wherein said eccentric assembly further comprises a counterweight assembly coupled to said shaft for
20 counterbalancing said piston assembly.

27. The pressure washer as claimed in claim 23, wherein the strap is shaped so that loads within the strap are distributed substantially uniformly throughout the strap.

28. A pump for pumping a liquid, comprising
a pump housing;
a head assembly coupled to the pump housing,
5 a cylinder being formed in the pump housing and head assembly;
a piston assembly disposed in the cylinder, the piston assembly including a piston capable
of reciprocating within the cylinder;
an eccentric assembly suitable for converting rotary motion of a rotating shaft to
rectilinear motion; and
10 a strap for coupling the eccentric assembly and the piston assembly;
wherein the strap is suitable for communicating the rectilinear motion of the eccentric
assembly to the piston assembly for reciprocating the piston in the cylinder to
pump the liquid.

15 29. The pump as claimed in claim 28, wherein the eccentric assembly
comprises:
a shaft suitable for being coupled to a drive shaft of an engine;
at least one bearing assembly for supporting the shaft in the pump housing so that the
shaft may rotate; and
20 an eccentric for converting the rotary motion of the shaft to rectilinear motion.

30. The pump as claimed in claim 28, wherein the eccentric assembly further
comprises a counterweight assembly coupled to the shaft for counterbalancing the piston
assembly.

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31. The pump as claimed in claim 28, wherein the piston assembly further
comprises a strap coupling assembly for coupling the piston to the strap.

32. The pump as claimed in claim 28, wherein the head assembly includes a
30 port for porting the liquid.

33. The pump as claimed in claim 28, further comprising a pressure unloader valve.

34. The pump as claimed in claim 28, wherein the pressure unloader valve
5 comprises:

a valve body having a high pressure port and a low pressure port;

a ball valve assembly received in the valve body, the ball valve assembly
including a ball, a ball seat disposed against the high pressure port, a
spring suitable for biasing the ball against the ball seat; and a plug
10 received in the valve body,

wherein the plug is threaded into the valve body for controlling the amount of bias
placed on the ball by the spring.

35. The pump as claimed in claim 34, wherein the ball seat includes a
15 restriction portion in which the ball floats for at to at least partially reduce surging of the
pump.